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essential points having already been discussed by Hobbs, Grimsley and others.

Petrographical Notes.—The rocks of the Laurentian area to the north and west of St. Jerome, Quebec, are briefly referred to by Adams⁶ as gneisses, anorthosites, amphibolites, limestones, quartzites, etc. Some of the gneisses are eruptive and others are probably sedimentary.

Miller and Brock⁷ have found in Frontenac, Leeds and Lanark Counties, Ontario, granites, gabbros, scapolite and pyroxene rocks of Laurentian age cut by dykes of quartz gabbro containing phenocrysts of pyroxene and plagioclase.

Keyes⁸ declares that the granites and porphyries occurring in the eastern portion of the Ozarks, in Missouri, "are very closely related genetically, and are to be regarded as facies of the same magma," the porphyry being the upper and surface facies of the granite.

GEOLOGY AND PALEONTOLOGY.

Canadian Paleontology.—In addition to the vertebrates (reptilia and batrachia) and land snails discovered by Sir Wm. Dawson in the interior of erect trees in the coal formations of Nova Scotia, and described by him in various scientific publications, fragments of arthropods have been found in the material collected. These were submitted for examination to Mr. Samuel Scudder who published a preliminary report in 1882, and now, after completing his study, gives these additional facts. A few species of Myriapods show traces of the bases of spines; the ventral plates in *Archiulus* are very broad; two new species of this genus are recognized; two species of *Mazonia* are indicated, one of which (*M. acadica*) confirms the separation of this genus from *Eoscorpius*; a faceted eye taken from a reptilian coprolite shows the presence of a true insect, probably a cockroach.

A report upon the Cenozoic Hemiptera of British Columbia, by the same author, comprises descriptions of nineteen species. Mr. Scudder calls attention to the great variety among these insects. Among the Homoptera, every specimen must be referred to a distinct species, and

⁶ Ann. Rep. Geol. Surv. of Can., Vol. VII, J., p. 93.

⁷ Can. Record of Science, Oct., 1895.

⁸ Bull. Geol. Soc. Amer., Vol. 7, p. 363.

in only one case can two species be referred to one genus. In the Fulgoridae each of the three species belongs to a different subfamily. Another striking feature of the fauna is the size of the individuals which compose it. The majority of them represent the most bulky species of their respective families. The average length of these Cenozoic species of Fulgoridae and Cercopidae is not less than two centimeters, and there are some that are double that length.

The author states that this insect fauna indicates that the deposits in which they occur are at least as old as Oligocene, but no definite statement as to the age of the beds can be made.

A third interesting paper in this series on Canadian fossil insects sums up the present knowledge of the Coleopterous remains of Canada. These have been found in seven distinct localities in that country, and at three very different horizons. The greatest interest attaches to the collection made at an interglacial locality near Scarboro' Ont., which yielded twenty-nine species, and is the largest assemblage of insects ever found in such a deposit anywhere. Forty-five species from the various localities are described by Mr. Scudder. They are referred to 27 genera, 2 of which are new. (Contrib. Canadian Paleontol., Vol. II, Pt. I.)

Jackson on the Development of Oligoporus.—The following is an abstract of the results of the recent studies of the Palæoechinoidea. In Oligoporus the interambulacra terminate ventrally in two plates, which present on their oral faces a reëntrant angle for the reception of a single initial plate of the area. Proceeding dorsally, new plates and new columns of plates are added, accenting by their appearance stages in growth, as he had previously shown in Melonites, until the full compliment of the species is attained. The single initial interambulacral plate of Oligoporus was compared with a similar plate in Melonites, Lepidechinus, young modern Cidaris, etc. At the ventral or younger portion of the corona of Oligoporus there are only two columns of ambulacral plates. The four columns characteristic of the adult are derived from these two by a drawing-out process. The four columns of ambulacral plates of adult Oligoporus are the equivalent of the two outer and two median columns of Melonites. These four columns in both genera are the morphological equivalent of the two columns seen in the ambulacra of Bothriocidaris, Cidaris, etc.

Oligoporus, as shown by the development of both ambulacral and interambulacral areas, is a genus intermediate between Palæechinus and Melonites. During the development of Oligoporus it passes

through a *Rhoëchinus* stage, and later a *Palæechinus* stage. *Melonites* in its development passes through an *Oligoporus* stage.

An early stage in developing Echinoderms was named the "protechinus" stage. At this stage are first acquired those features which characterize the developing animal as a member of the Echinoidea. The protechinus stage in Echinoderms is directly comparable to the protoconch of Cephalous Mollusca, the protegulum of Brachiopods, the protaspis of Trilobites, etc. The Echinoderm at this period in its growth has a single interambulacral plate (representing a single column of such plates), and two columns of ambulacral plates in each of the five areas. This stage is seen in *Oligoporus*, *Lepidechinus*, *Goniocidaris* and other genera; it finds its representative in an adult ancestral form, in the primitive, oldest known genus of the class *Bothriocidar* is of the Lower Silurian, which has but one column of interambulacral and two columns of ambulacral plates in each area.

Species of *Oligoporus* and *Melonites* with few interambulacral columns are considered the more primitive types, as they are represented by stages in the development of those species which acquire a higher number of columns in the adult.

The structure of the ventral border of the corona of *Archæocidaris* was described. It presents a row of plates partially resorbed by the encroachment of the peristome, as in modern *Cidaris*, etc. Ambulacral and interambulacral plates on the peristome were described in *Archæocidaris*, also teeth and secondary spines on the interambulacral plates of the corona.

This paper contains a classification of Palæozoic Echini based on the structure and development of the ambulacral and interambulacral areas and the peristome. It will be published in the Bulletin of the Geological Society of America.—*Science*, Nov. 22, 1895.

American Fossil Cockroaches.¹—This memoir, published as Bulletin 124 of the U. S. Geological Survey, is a revision of the known species of American fossil cockroaches to date. The descriptions of new forms are interpolated in a systematic list of all the species yet recovered from the rocks, and such tables have been added as may enable the student to readily determine any new material. With the publication of this essay all species hitherto described will have been figured.

¹ Bulletin of the United States Geological Survey, No. 124. Revision of the American Fossil Cockroaches, with Descriptions of New Forms. By Samuel H. Scudder, Washington, 1895.

The new forms are Paleozoic, and are mostly from two new localities—Richmond, Ohio, and Cassville, West Virginia. There are, however, a number of new species from old horizons.

Tables of the geographical and also of the geological distribution of both American and European genera are given in the introduction, followed by a statement of the characteristics of the Mylacridae and a discussion of some of the anatomical features of paleozoic cockroaches. In this connection the author calls attention to possible mimicry among these old forms of insect life, and figures side by side a cockroach wing and a fern frond found associated in the same beds, to show how close is the resemblance between them in the general distribution of nervures and in outline.

The illustrations comprise twelve page plates and three figures in the text.

The Comanche Cretaceous.—Prof. R. T. Hill has found some outlying areas of the Comanche series in Barber and Comanche Counties, Kansas, and in G County, Oklahoma, and in the Tucumcari region of New Mexico. These strata are identified from paleontological evidence.

The importance of a correct determination of these beds is evident from the following concluding remarks of the author.

“The geology of the outlying areas of the Cretaceous preserved in the scarps of the Plains adds greatly to our knowledge of the distribution, variation, paleontology and history of the beds of the Comanche series, and of the progressive oscillatory conquest of the Great Plains region by the sea in Cretaceous time. The Belvidere (Kansas) beds have revealed the following additions to our knowledge of Cretaceous paleontology: First, a lower stratigraphic occurrence of the dicotyledonous Dakota flora than known, whereby we may now say that dicotyledons make their first appearance before the beginning of the Washita subepoch, instead of in the Dakota as hitherto believed. Second, a similar downward range in the geologic scale of the ichthyic vertebrates of hitherto supposed Upper Cretaceous range. Third, intermingling of these plants and fishes with molluscan species and other vertebrates of the Washita division such as has not hitherto been found in the Comanche series.” (*Amer. Journ. Sci., Lol. L, 1895*).

Kolguev Island, which lies 130 miles southeast of Novaya Zemlya, differs, according to Col. Feilden, in geological structure, both from mountainous islands of its neighbor and from Russian Lapland. The entire elevated region of the island is composed of beds of sand contain-

ing erratic boulders, to a depth of not less than 80 feet, and these sandy beds rest on the Kolguev clays. These in turn are 50 miles long by 40 wide, with a thickness of not less than 250 feet, probably more. This great mass is evidently a glacio-marine deposit. A few molluscan remains were found in it, all well known boreal forms existing at the present time, but no vertebrates nor drift-wood. A collection of erratics made by the author are identified by Prof. Bonney as rocks of Mesozoic age, either Jurassic or Wealden. (*Quart. Journ. Geol. Soc.*, 1896.)

Palæontologia Argentina.—Vols. I (1891), II (1893), and III (1894).—The Museo de la Plata of Argentina has progressed thus far with the publication of monographs illustrative of its magnificent collection of fossil vertebrata of that country. The style of the publication is worthy of the subject; the size selected being folio, and the plates phototype reproductions of the originals, often of the natural size. The whole is issued under the supervision of the director of the Museum Dr. Francisco P. Moreno, who contributes some of the articles in connection with M. Mercerat; while Dr. Lydekker, of London, furnishes the greater number.

The first volume, on the extinct birds of Argentina, consists solely of plates, with pages of names referring to the figures. These plates depict objects of great interest, many of the bones belonging to the extraordinary family of the Phororhacidae of Ameghino, which seem to be nearly allied to the existing Cariamidæ of South America. Most of these birds are of gigantic size, and their powerful legs and hooked beaks indicate that they were quite competent to maintain their place in the fauna of which they form a part. We have waited for some years before noticing this valuable publication, in hopes that the text would appear. It seems, however, that there is no intention of publishing a descriptive part. Under the circumstances we must regret that names were attached to the figures, for, although figures may give currency to specific names, they cannot do so for names of any higher grade, and a considerable amount of synonymy has been thus created. Dr. Ameghino has also subsequently shown, that in this atlas a good many duplicate names have been given to the same species.

In the second part are published three memoirs by Dr. Lydekker. These include figures and descriptions of Dinosauria and Cetacea from Patagonia, and mammalia Ungulata from the same region. The magnificent plates are accompanied by descriptions, and this volume is therefore more valuable than its predecessor. Unfortunately the de-

scriptions are quite inadequate, and the specimens will have to be more fully described before their characters can be sufficiently known.

The third volume is chiefly occupied with the Edentata, and this memoir is admirably illustrated. The descriptions (by Dr. Lydekker) are rather more full than those of Vol. II, but not full enough. They are marred by frequent supercilious references to Dr. Florentino Ameghino, who is the most competent paleontologist of the vertebrata in South America, and whose descriptions compare very favorably with those of other paleontologists in all respects. His figures are not so good as those of the work now under review, for here we have a case in which the most skilful hand has not had the financial advantages it ought to have had. From our past experience we should say that when Dr. Lydekker states that organic forms are distinct species he is apt to be correct; but when he identifies forms alleged to be distinct, further examination is in order.—C.

BOTANY.¹

Tilden's American Algæ.—The first century of this distribution by Josephine Tilden, of Minneapolis, was sent out about a year ago, but has not hitherto been noticed in these pages. The specimens are very neatly prepared, and are attached to cards or mica slips. In most cases they contain an abundance of material, but, in a few instances, we might wish for more generous specimens. The species represent the following genera:

Oedogonium (4), *Sphaeroplea* (1), *Hormiscia* (2), *Chaetophora* (4), *Draparnaudia* (3), *Stigeoclonium* (6), *Conferva* (1), *Microspora* (1), *Urospora* (1), *Cladophora* (15), *Pithophora* (1), *Vaucheria* (5), *Botrydium* (1), *Hydrodictyon* (1), *Tetraspora* (2), *Palmella* (1), *Protococcus* (3), *Euglena* (1), *Spirogyra* (10), *Cosmarium* (1), *Porphyrosiphon* (1), *Symploca* (2), *Lyngbya* (2), *Phormidium* (1), *Oscillatoria* (8), *Spirulina* (1), *Gloeotrichia* (2), *Tolypothrix* (1), *Nostoc* (3), *Anabaena* (2), *Merismopedia* (1), *Navicula* (1), *Pleurosigma* (1), *Gomphonema* (2), *Cocconeis* (1), *Nitzschia* (1), *Odontidium* (1), *Synedra* (2), *Fragilaria* (1), *Cystopleura* (1), *Lysigonium* (1).

The introduction of *Euglena* among plants is, in our opinion, a mistake, although one which will probably do no harm, since it will be difficult if not impossible to recognize them from dried specimens.

¹ Edited by Prof. C. E. Bessey, University of Nebraska, Lincoln, Nebraska.